<u>Subject Area:</u> **Test and Evaluation**

<u>Title</u> – *Applying a Systems Architecture (SA) tool to support Modeling and Simulation in the VCOP Program*

The Virtual Cockpit Optimization Program (VCOP) addresses the problem of information overload experienced by pilots of modern military aircraft and is simultaneously working to reduce the cost of upgrading legacy aircraft. VCOP will provide the pilot with information such as situational awareness, sensor imagery, flight data, and battlefield information in a clear, non-confusing, and intuitive manner, thus making the aircraft easier and safer to fly. The VCOP development activities focus on the integration of independently developed technologies into a single system. VCOP is comprised of the following independently developed components representing the advancements in state-of-the-art technologies:

- Full color, high resolution, high brightness helmet-mounted display (HMD) that incorporates Virtual Retinal Display (VRD) technology
- Three-Dimensional (3D) Audio
- Sound Imagery
- Speech Recognition
- Text-to-Speech Synthesis
- Innovative Symbology
- Tactile Situational Awareness System (TSAS)
- Crew-Aided Cognitive Decision Aides

Modeling and Simulation (M&S) tools play a key role in the VCOP development program. Additionally, this program utilizes a Systems Architecting (SA) tool and a Systems Engineering approach to information management in support of M&S. This paper describes how the SA tool supports M&S used in the VCOP program. The description will detail how the SA tool and systems engineering methodology are used to define program goals, analyze technical performance requirements, trace VCOP requirements to M&S capabilities, and manage verification of M&S results.

A simulated mission scenario will be used to demonstrate and verify VCOP system requirements. This paper specifically demonstrates how mission threads developed in the SA tool and traced to system functionality help define and provide structure for the mission scenario. The description also discusses how the simulation of the mission scenario in a virtual environment was used to augment development and analysis. As a result, these tools not only enhance communication and understanding among team members, but also ensure that the system successfully meets its technical performance and programmatic requirements.

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